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Anglais & Documentation

THE ASFIS SYSTEM

AND ITS DATA BASE ASFA

1991 - 1992

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ASFI/ASFA : PRESENTATION

The Aquatic Sciences and Fisheries Information System (ASFIS) is a computarized, international and cooperative system jointly sponsored by :

- The Food and Agricultural Organization (FAO)
- The Intergovernmental Oceanographic Commission of UNESCO (IOC)
- The United Nations Office of Ocean Affairs and the Law of the Sea (UNOALOS)
- The United Nations Environment Programme (UNEP)

with the participation of UN members States including : Canada, China, France, Germany, India, Japan, Mexico, Norway, Portugal, Russia, Southeast Asia, USA and United Kingdom.

Products and Services

A data base : ASFA, loaded in the USA on the Dialog Host, available as a monthly printed journal and a compact disc database.

- *Update* : monthly/25 000 ref.
- *Coverage* : biological sciences, exploitation of living and non living resources ocean technology, policy, pollution, social and legal aspects concerning marine, brackish and fresh waters.

On 1st October 1989 the database includes 296 000 bibliographic references issued from books, serials, meetings, thesis, reports, grey literature ....

An editor : CSA (Cambridge Scientifc Abstract) that has published the ASFIS Thesaurus for FAO prepares the ASFA database and publishes ASFA Aquaculture Abstract under contract to FAO.

Other Products

. *Current awareness Publications*

- Marine Science Contents Table (MSCT)
- Fresh water and Aquaculture Contents Table (FACT)

. *Directories and Registers*

- International Directory of Marine Scientists
- Regional Directories compiled with the United Nations Environment Programme
- ASFIS Meetings Register.

The French Network

includes eight members under the responsability of *IFREMER* input Centre

. CERS, Biarritz
. CEMAGREF, Cestas-Gazinet
. IFREMER, Brest
. INRA, Laboratoire d'Hydrobiologie, St Pee/Nivelle
. MNHN, Laboratoire d'Ichtiologie, Paris
. ORSTOM, Paris, Bondy.

The database is available free of charge for the French memberships throughout *IFREMER* Centre in Brest. We can interrogate on microcomputer or Minitel.

The authors of the following articles mentioned in the biography emphasize on the needful to acquire computerized system on fisheries, a key factor in modern information systems, applied to developing countries. Southeast Asia with its specialized centres and bibliographic information sources for fisheries is especially interested in this information system.

The main articles deal with :

- the background in fisheries information
- the ASFIS system
- the current and possible developments of ASFA/ASFIS.

It was necessary to gather the whole literature issued throughout the world on fisheries and covering subjects linked to this scope.

The setting of such a system required important financial means. Only an institution such as FAO could bring into play such an information system linked to its training programmes on fisheries . This led to the ASFIS system creation during the sixties and its products and services both under printed and computerized forms; one the most famous service is the database ASFA.

As these articles show, ASFIS is a co-operative system which aims to involve more and more countries and to improve the system tools, to co-ordinate input to ASFA developing training of the users and information scientists.

FISHERIES LITERATURE SERVICES : AN OVERVIEW

Jay MacLean, Chief Editor of *ICLARM*, in his article, focuses the minor role of fisheries which has lagged with regard to other scopes like agriculture for exemple.

Information on fisheries and aquatic sciences as testified in the annexe table is disseminated in information sources (journals or databases) whose the main subject is agriculture.

Information provided by databases and abstract journals is a background and the grey literature is scarce. It often concerns searchers and the other fisheries workers "are hardly served". In Southeast Asia, the only database on fisheries material *AIBA* has no links with *ASFA*.

Although the input bibliographic references in *ASFA* are mainly supplied by European, North and Latin American networks, enlarging of Japanese and Russian participation, *ASFA* is regarded as the best and central source of fisheries bibliographic information.

The aim of the FAO is to spread its network in developing countries with a view to settle national and regional information systems which could be linked up to *ASFA*.

ASFIS : VEHICLE FOR INTERNATIONAL EXCHANGE OF SCIENTIFIC INFORMATION

ASFIS is an international cooperative system whose the purpose is to gather the world literature on aquatic research including a cross scientific activites aspect.

The development of ASFIS system has contributed tosupport the FAO's fisheries programme and make the developing countries realize the importance of fisheries, aquaculture and fish products as proteins sources.

At the present time, ASFIS covers all aspects of aquatic sciences : biology, technology, exploitation of living and non-living resources, related policy, social and economic aspects, processing and marketing of aquatic aspects in both marine and freshwaters.

The setting of such a system was possible owing to the financial support of the United Nations Environment Programme during 1960/1976 period.

The database ASFA has emerged in 1959 from a publication "Current Bibliography for Aquatic Sciences & Fisheries". Each entry into ASFA includes an English translation of the title, an English language abstract and subject, taxonomic, geographic keywords. Cataloguing and indexing works can be carried out owing to the system tools (cf. bibliographic references) by a network of eighteen institutions in eight memberships. The UNDP's Aquaculture Development and Coordination Programme (ADCP) has choosen to link its agriculture information system to ASFA.

The system tools of ASFIS represents a methodology used by some countries in their own information networks. ASFIS Thesaurus is used to index *Canada's Annual Bibliography of Fisheries Publications.* In Australia it has served as a basis for a more specialized thesaurus for an information system on the *Great Barrier Reef.* In Argentina the terminology has been translated into Spanish and published for local Centres.

ASFA/ASFIS DEVELOPMENTS

In that paper, presented at the Meeting of European Information Centres and Librairies held in Paris on April 1989, *Allen Varley* shows that ASFIS system is taking to the technology developments.

In spite of budgetary problems that have hampered entries into ASFA resulting in a backlog ASFIS is a relatively cheap system. At the present time the problems are resolved and in 1990 some 36 000 papers were processed.

The ASFIS strategy is to recommend the use of CDS/ISIS bibliographic software which has been developed by UNESCO and which is powerful and especially adapted to developing countries. It enables to capture and record information in local databases. Similarly, data can be downloaded from ASFA and transfered into local databases.

Suggestion is made for using the Compact Disc technology in order to achieve a guide of key book in Aquatic Sciences.

An important aspect of ASFIS is the training to international practices for users and information scientists. In France, training sessions have been organized in *IFREMER's* Centres and at the *Oceanographic Institute of Paris* for students of Paris VI and Paris VII Universities.

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REPORT

Prod'homme Jacqueline - ASFA Staff Meeting, Rome, 16-21 octobre 1989.
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ASFIS Reference Series

ASFIS 2 - ASFIS Subject Categories & Scope Descriptions

ASFIS 3 - ASFIS guidelines for Bibliographic Descriptions.

ASFIS 6 (Rev.1) - Aquatic Sciences and Fisheries Thesaurus, 1986.

ASFIS 7 (Rev.1) - ASFIS Geographic Authority List, 1985.

A B B R E V I A T I O N S

ADCP	– Aquaculture Development & Coordination Programme
ASFA	– Aquatic Scientific Fisheries Abstracts
ASFIS	– Aquatic Sciences & Fisheries Information System
CEMAGREF	– Centre d'Etudes du machinisme Agricole & Forestier
CERS	– Centre d'Etudes et de Recherches Scientifiques
CREMA	– Centre de Recherche en Ecologie Marine et d'Aquaculture
CSA	– Cambridge Scientific Abstract
FAO	– Food & Agricultural Organization
FACT	– Freshwater & Aquaculture Contents Table
ICLARM	– International Center for Living Aquatic Resources Management
IFREMER	– Institut Français pour la Recherche et l'Exploitation de la Mer
INRA	– Institut National de la Recherche Agronomique
IOC	– Intergovernmental Oceanographic Commission
MNHN	– Museum National d'Histoire Naturelle
MSCT	– Marine Sciences Contents Tables
(ORSTOM)	– Institut Français de Recherche Scientifique pour le Développement en Coopération
UNEP	– United Nations Environment Programme
UNOALOS	– United Nations Office of Ocean Affairs and the Law of the Sea

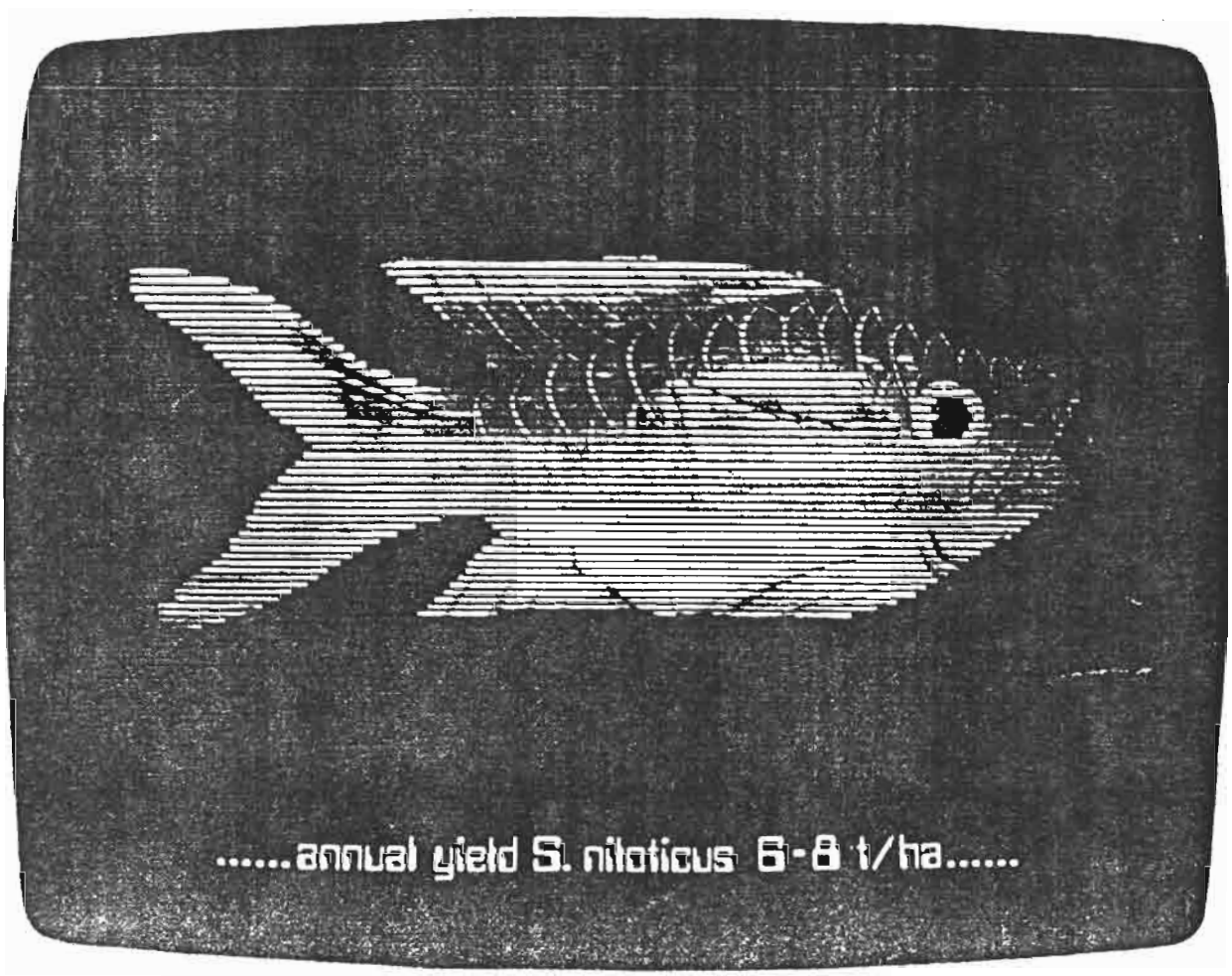
ICLARM NEWSLETTER

Official Publication of the International Center for Living Aquatic Resources Management

ol. 5, No. 2 | Metro Manila, Philippines | April 1982

FISHERIES INFORMATION

Bibliographies, Databases, Directories Information Systems, Reprints and Statistics



in this issue:

ARTICLES

REGULAR FEATURES

COVER

Computerization is a key factor in modern information systems, as articles in this issue show.

ICLARM Staff Profile

Ronald Ventilla

Ron Ventilla, born in Scotland, obtained his B.Sc. degree in Zoology/Marine Biology from Glasgow University where he developed an interest in studying the role of marine microorganisms in trophic systems.

His doctoral dissertation was in marine pollution at Leeds University's Wellcome Marine Laboratory in the early 1970's, during a period when marine pollution problems made daily headlines. This work led to a teaching appointment in marine pollution at Newcastle University's Dover Marine Laboratory. There Ron developed an interest in pollutants in marine invertebrates, including shellfish. An opportunity to enter the field of shellfish research led to an appointment as Shellfish Research Officer for the British White Fish Authority in 1975, coordinating an investigation into scallop farming on the west coast of Scotland, which was the first such investigation in Europe.

Following a meeting with visiting Japanese shellfish researchers in 1976, Ron received a research/study scholarship at Tokyo University of Fisheries from 1977-1979, specializing in the Japanese scallop and oyster industries. His reviews of the Japanese scallop and oyster industries, including all recent data up to 1979, will be published later this year in "Advances in Marine Biology."

Returning to the U.K., he was appointed Senior Research Officer with the White Fish Authority in charge of an oyster and scallop development program for the Scottish west coast, using modified Japanese methodology. He also participated in planning scallop culture investigations in the Scottish Islands and Ireland and was the appointed scallop culture spokesman on the Cultivation Committee of the U.K. Shellfish Association.

Ron joined ICLARM in April 1982, as the Shellfish Biologist assigned to the ICLARM-Government of Thailand joint project for Technical Assistance on Coastal Aquaculture. The project is focused on bivalve culture (see ICLARM Newsletter, January 1981). He is working with scientists of the Brackishwater Division of the Thai Department of Fisheries. A

"Publish or perish" may be a useful stimulant to researchers in western, developed countries. In many developing countries, there is no such maxim. Graduates who have pursued their studies overseas generally have to wait out a period of bondage on return, after which they may be released into administrative posts beyond their experience, or pass into the private sector.

For those who stay at "home," careers are also determined by seniority and connections, not by published research. So why bother?. Indeed, the funds are, more often then not, unavailable to an institution for such extravagances as publishing its research results or annual report, or for paying seemingly ridiculously high charges to many a western journal to publish its findings.

In these countries, results of research and surveys deemed worthy of being typed and produced in more than "original plus file" copies are potentially quite valuable. This applies to statistical and survey data as well as research results. At present, they are generally no more than that–potentially valuable.

Such material needs to be "captured" by an actively searching information system that will allow users the opportunity to assess, emulate or otherwise use the previous work. Then there can be feedback, gratification, recognition and a stimulus to further research–all the less-altruistic reasons that are nevertheless more likely to stimulate a scientist than "ars gratia artis."

Fisheries information systems are embryonic at best in developing countries, but there is an encouraging number of albeit overlapping systems being proposed, for example, for Southeast Asia.

This Newsletter issue describes some of the established and proposed systems and comes to grips with databases, reprints, statistics and other basic information about information. Ed.

Fisheries Literature Services: An Overview

JAY MACLEAN
Chief Editor, ICLARM

Information availability on fisheries and aquaculture has lagged behind that of other disciplines, reflecting the minor role of fisheries in national economies, particularly of the developed countries from which information systems generally emanate.

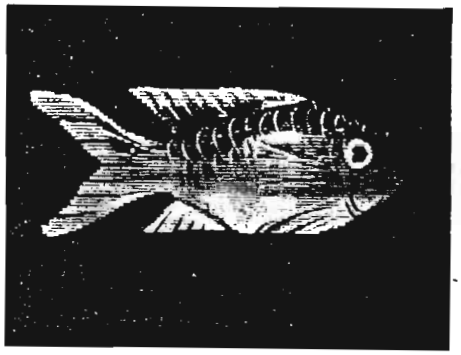
Western Developments

Fisheries scientists began their break from the painstaking searches of *Biological Abstracts* and *Zoological Record* with the advent of abstracting, or secondary, journals for the aquatic sciences–*Aquatic Science and Fisheries Abstracts* (ASFA), *Oceanic Abstracts* and related journals–*Pollution Abstracts*, etc.

Later, these became marketable "databases" when computer systems, such as DIALOG, began to operate. One database, AQUACULTURE, can only be searched by computer. The others are still available in published form also.

Other secondary journals have taken over the previous library service of providing contents pages of relevant primary journals, e.g., FAO's publications, *Freshwater and Aquaculture Contents Tables* and *Marine Science Contents Tables;* the Institute for Scientific Information's (ISI) *Current Contents* has overtaken them in coverage and services offered, such as publication ordering and provision of authors' addresses.

Some of the computerized databases offer hard copy availability of all papers indexed. They also provide abstracts, a major advantage over the *Contents* journals. However, the databases and abstract journals provide the researcher with historical information only, and a limited overview of recent, primary literature at that. The extension worker, the statistician, etc., are hardly served.



The coverage of the various aquatic secondary journals and databases overlaps and is restricted to more important sources. "Grey" literature is scarce, and there is always geographical bias, either intentional or circumstantial. AQUACULTURE, for example, began as a referral collection (all items are on microfiche) for U.S.A. aquaculture only (see article, p. 11); ASFA has broadened its coverage from predominantly European and North American to include Japanese, Russian and Latin American primary literature (see article, p. 6). However, the Japanese segment recently dropped out due to financial problems, although Japan itself is now well served in this area (see article, p. 12).

These vagaries of secondary journals/databases are rarely publicized but they illustrate the existing less-than-perfect basis for fisheries information retrieval.

Developing Countries

Turning to the developing countries, particularly in the tropics, fisheries information sources, other than individual libraries, are almost non-existent. In Southeast Asia, two little known services support fisheries workers to some extent. BIOTROP, the Indonesian-based Regional Centre for Tropical Biology, offers bibliographic services which include aquatic biology; and AGRIASIA, the regional computerized literature service for agriculture. Produced since 1977 by the Agricultural Information Bank of Asia (AIBA), a SEARCA (Southeast Asian Regional Center for Graduate Study and Research in Asia) project, AGRIASIA is a quarterly bibliographic journal, containing current literature on agriculture, including a large amount of grey material. Aquatic Sciences and Fisheries form one subject entry, but they are not covered completely. From 1982, abstracts, previously absent, are also included.

With a little digging, quite a large number of other sources of bibliographic information on fisheries can be unearthed. I have compiled a list of them (see p. 5) to supplement the articles in this issue; there is some bias towards Southeast Asia, but together the sources cover most of the world's fisheries-related publications.

Other Developments

ASFA is the recognized central source of fisheries bibliographic information. Its network has been gradually spreading into the developing regions (p. 6), and proposed regional and national systems are usually designed to link up eventually to ASFA.

In Southeast Asia, SEAFDEC is developing various information systems (SEAFIS; SAFIS–see article, p. 25) in both fisheries and aquaculture. FAO has an embryonic international aquaculture information system that includes statistics and production data as well as a literature database (AQUIS–see article, p. 9).

The only existing database with fisheries material in Southeast Asia, AIBA, has no interaction with ASFA, and in the South Pacific an emerging bibliographic center is also concentrating on setting its own house in order (see article, p. 20).

The International Centre for Marine Resources Development (ICMRD) at the University of Rhode Island, U.S.A. is developing a computerized special library which, in view of ICMRD experience and

location, is initially concentrating on Latin American fisheries. In Canada, the International Development Research Centre (IDRC) now provides a bibliographic current awareness service to its fisheries project personnel in developing countries around the world. The output from this service is also available to other institutions.

How much information is there?

Given the minor role of fisheries relative to other food-producing sectors, it can be expected that the scientific literature output of fisheries research will also be small compared to that of agriculture. Advances in agriculture need a high level of technology to intensify yields, reduce predation and disease, etc. Fisheries are not amenable to such intensification, while aquaculture has only recently been recognized as having significant potential. Comparatively then, there ought to be proportionally less fisheries than agricultural literature output.

The major agricultural databases, shown on p. 5 (AGRICOLA, AGRINDEX, CAB Abstracts) are each adding 120,000 or more entries per year. ASFA contains some 15% of that figure in its living resources section (ASFA 1). Given the overlaps between the agricultural and between the aquatic databases, a figure of 10% seems a useful comparative relationship between the broadly scientific literature in the two sciences.

Implications for Southeast Asia

The implications for Southeast Asia are worth examining because of the interest of the various agencies in bringing order to bear on the scattered literature resources of the region.

Fish products as protein sources are more important in Asia than most other regions. Nevertheless, the *value* of fisheries production in the major fishing countries of Southeast Asia is only about 9.5% that of agriculture.

The agricultural database in Southeast Asia, AGRIASIA, currently grows by some 10,000 entries per year. Much of it is grey literature and 60% of the total available material is said to be retrieved; that is, there are some 16,500 articles produced per year. Therefore, fisheries contributions are probably somewhat less than 1,650 per year.

Another indicator of relationship between regional and world fisheries literature production is the number of researchers, probably no more than 1,000 in Southeast Asia of a world total of some 15,000+ fisheries scientists.

If the same recovery rate of material can be attained for fisheries as for agriculture (60%), then one can confidently expect about 1,000 articles/year will be retrieved in the region. AGRIASIA consistently includes 5% aquatic science and fisheries entries, or 500/year. The target of a regional system to improve this retrieval is thus between 500 and 1,000 articles/year.

Fisheries information workers can learn much from the experience, nature and size of agricultural information systems. In the case of Southeast Asia, the appropriate *level of effort* for a fisheries bibliographic system is suggested to be 10% of that of a similar agricultural system. The economics of relative production and value of the industries and usership of the information systems may ultimately dictate that this figure be not grossly exceeded.

Computer literature searching

There is nothing mysterious about using computer databases to help locate material you need and to keep you up to date with the latest references in particular subject areas. As the table on p. 5 shows, relevant literature can be scattered across several disciplines and appear in different databases.

- First, locate a database searching service. Your librarian may know of larger libraries with *terminals.* The overseas telecommunications companies have listings of the subscribers to the various communication networks (e.g., Telenet, Tymnet). These include companies and institutions offering search services. Nearly all sources are in developed countries.
- Database marketers charge an average about $50/hour computer time. As well, there are telecommunication charges of $5-15/hour and rent/lease costs of the terminals. Finally the references cost 10-50 cents each. A search may only take a couple of minutes, but you should enquire about expected fees for a search in advance. An average search is around $15-20.
- Write your request carefully. Asking for references about plankton, for example, is not sufficient. (That one word appeared in nearly 41,000 references, abstracts and descriptions in BIOSIS since 1969). Be as specific as possible. This allows high precision and a manageable quantity of output. On the other hand, for something like bibliography preparation, you may want *all* the references that mention your subject area. Be prepared for a big bill. There are other ways to limit the search, depending on the database format, e.g., by specifying language, geographical area, years covered, marine or freshwater.
- The searcher enters the key words in a certain pattern (using Boolean logic operators) and the result is a series of references (with or without abstracts, on your request), which are printed and mailed to the searcher immediately after the search.
- If you have asked to be kept up to date on the subject, a simple codeword to the computer will ensure that you receive a regular, usually monthly, printout of the latest references (and invoice) until you ask it (via your search service) to stop.
- Now, you only have the references. Tracking down the articles in question is often the hard part (see p. 21)!

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  Integrated crop-lives
  Tetangco, M. H.
  Book Series, Food
Council, 1980, No.
  Languages: En
  tab., fig., ref., OAE
  The volume brings toge
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Malaysia and Philippines
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If you have a direct terminal link to the ASFA database, as we have at ICLARM, an online printout looks like the sample above. It's cheaper to order offline prints (below), which look nicer and are also the format if you mail-order a literature search.

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  In: Deep-sea biological in
tropical Pacific
  Parin, N.V.
  ed.)
  PUBL: Publ. by: Nauka-Moskva (
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  DOC TYPE: Book
  JOURNAL ANNOUNCEMENT: 7802
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Bibliographic Information Sources for Fisheries

Title	Nature	Frequency or update	Scope	Entries/yr	Source	Commentary
AGRIASIA	Journal	Quarterly from 1977	Agriculture and Fisheries in Asia	10,000	Agricultural Information Bank of Asia, Philippines	Includes 5% fisheries and aquatic sciences
AGRICOLA	Database	Monthly from 1970	World agriculture	120,000	National Agricultural Library (U.S.A.), via DIALOG	–
AGRINDEX	Journal Magtape	Monthly	World agriculture	120,000	FAO (AGRIS)	Contains 2% fisheries and aquatic sciences
AQUACULTURE	Database	Monthly from 1970	World aquaculture	1,200	NOAA, U.S.A., via DIALOG	Offers copies of all citations
AQUACULTURE ABSTRACTS	Journal	Quarterly	Published and unpublished aquaculture	1,000	Aquaculture Dept., SEAFDEC, Iloilo, Philippines	New and retrospective. All documents held in SEAFDEC library
ASFA	Journal Database	Monthly from 1978	World fisheries and aquaculture	28,000	FAO, via DIALOG	Journal monthly from 1971. Best general source
AUSTRALIAN SCIENCE INDEX	Microfiche, Printout	Bimonthly from 1976	Australian science	6,500	CSIRO, P.O. Box 89, Melbourne, Australia	Searches made on request
AUSTRALIAN SCIENTIFIC AND TECHNOLOGICAL REPORTS	Journal	Bimonthly	Reports, conf. papers, theses	3,000	National Library, Canberra, Australia	Includes fisheries
BIOSIS	Journal Database	Monthly from 1969	Worldwide life sciences	125,000	Biological Abstracts, via DIALOG	Covers 8,000 primary journals
CAB ABSTRACTS	Database	Monthly from 1973	World agriculture and biology	144,000	Commonwealth Agricultural Bureaux, via DIALOG	Contents of 26 abstract journals; some include fish farming and management
FAO DOCUMENTS	Journal Printouts	Monthly	World agriculture and fisheries	3,600	FAO	Includes Fisheries Department output. Searches on request.
FSTA	Journal Database	Monthly	World food science and technology	6,000	International Food Information Service, via DIALOG	Includes fisheries—post-harvest
INDONESIAN BIOLOGICAL, AGRICULTURAL AND AGRO-ECONOMIC INDEX	Journal	Bimonthly	Publications in Indonesia	2,000	Bibliotheca Bogoriensis, Bogor, Indonesia	Includes fisheries
JAPANESE* AGRICULTURAL SCIENCE INDEX	Journal	Monthly in Japanese	Agriculture, fisheries and forestry	10,000	Association of Agriculture and Forestry Statistics	Covers over 50 fisheries journals
JOURNAL OF ABSTRACTS AND REVIEWS	Journal	Quarterly	Indian economics	600	Indian Council of Social Science Research, New Delhi	Includes few fisheries items
KOREAN SCIENTIFIC ABSTRACTS	Journal	Bimonthly	Korean science	700	Korea Scientific and Technological Info. Centre, Seoul	Includes Aquatic Sciences
OCEANIC ABSTRACTS	Journal Database	Monthly from 1964	World marine	9,000	Data Courier, U.S.A., DIALOG	Includes living and non-living resources, shipping and legal aspects
PHILIPPINE ABSTRACTS	Journal	Quarterly	Philippine science and applied sciences	500	Scientific Library and Documentation Div., National Science Development Board	Includes Zoology, Marine Husbandry
POLLUTION ABSTRACTS	Journal Database	Bimonthly from 1970	Environmental	8,500	Data Courier, U.S.A., via DIALOG	Water pollution included
SCISEARCH	Database	Monthly from 1974	World science and technology	96,000	Institute for Scientific Information, U.S.A., via DIALOG	Covers Current Contents, Science citation index

Other, lesser known sources likely to contain some useful fisheries/aquatic science bibliographic material from agricultural journals include:

Abstracts on Tropical Agriculture, monthly publication from Koninklijk Instituut voor de Tropen, Department of Agricultural Research, Mauritskade 63, 1092 Amsterdam, The Netherlands.

Biological and Agricultural Index, monthly publication from H.W. Wilson Co., 950 University Ave., Bronx, New York, U.S.A.

Related disciplines have journals/databases available also. They may be consulted in multidisciplinary studies and include: AQUALINE, ENVIROLINE, ENERGYLINE, SOCIAL SCISEARCH, and SOCIOLOGICAL ABSTRACTS.

The databases recorded above are all available via the DIALOG system. Some are also available through other retrieval systems, SDC Orbit and Bibliographic Retrieval Services (BRS) in the United States, and through other systems in Europe and elsewhere.

*For other Japanese sources, see article p. 12.

.....ASFIS: Vehicle for international exchange of scientific information.....

R. NEEDHAM
Editor in Chief
Aquatic Science and Fisheries Abstracts
FAO, Rome, Italy

The "Aquatic Sciences and Fisheries Information System" (ASFIS) is a computerized modular system for the collection and dissemination of information relevant to the interests of individuals and institutions concerned with aquatic research and the exploitation of the resources of the aquatic environment.

Some of the files on which ASFIS is based have their origins in the formative years of the FAO fisheries program. They were established through sheer necessity: such information services as existed then were totally inadequate to support the emerging program. Thus, the then-mid 1950's Fishery Biology Branch was obliged to dedicate a fair portion of its manpower to the compilation of a running bibliography on fisheries literature. This led, in 1959, to the publication 'Current Bibliography for Aquatic Sciences and Fisheries'—forerunner of what is now the ASFIS bibliographic database, monthly up-dates to which are published as "Aquatic Sciences and Fisheries Abstracts." Similarly, the ASFIS Experts Register, a computer-searchable file the contents of which go to press on an *ad hoc* basis in the form of directories, is an extension of a biographical index of fishery scientists built up in FAO during the early 1960's to facilitate recruitment of personnel for field assignments.

As interest in the oceans and their resources mushroomed, the concept of a cooperative approach for the management of the rapidly expanding volume of information being generated, found acceptance. The FAO files were thus augmented in scope and adapted to keep pace with this development. Today, ASFIS covers all aspects of the science, technology and management of the "aquasphere," both marine and freshwater, including socioeconomic and legal aspects. The Ocean Economics and Technology Branch (OETB) of the UN Department of International Economic and Social Affairs, and the Intergovernmental Oceanographic Commission (IOC) of Unesco co-sponsor the system with FAO. Points of contact throughout the world of OETB, IOC, and FAO are used to collect and validate information for the ASFIS registers.

It is this adaptive evolution of ASFIS which perhaps most distinguishes it from other cooperative information systems, and has led to its general acceptance among participating agencies and institutions. All uses of ocean-space have potential interaction with each other, as do natural phenomena within and over water masses. Thus, the concept of a single information system covering all aspects not only makes good sense scientifically; it is also easier to explain and promote at the administrative/political levels in the governing bodies and regional associations of the UN and its agencies. The generous financial support of the United Nations Environment Programme during the period 1976-1980 accelerated the emergence of ASFIS to its pre-eminent position.

The ASFIS Bibliographic Database

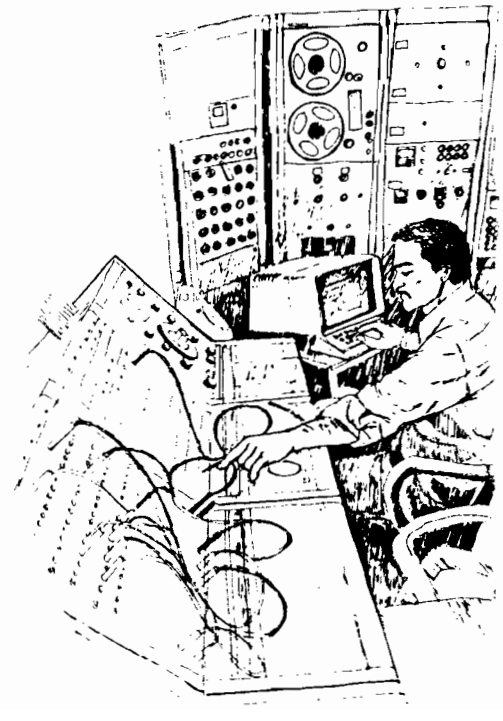
At the end of 1981, this database carried 107,896 references to scientific literature accessioned since January 1978; about 2,400 are added each month. Each record includes an English translation of the title, an English-language abstract and subject, taxonomic and geographic index entries as relevant. Work nearing completion will soon add 44,769 references to literature accessioned between January 1975 and December 1977.

Database entries are published monthly as "Aquatic Sciences and Fisheries Abstracts" (ASFA), each issue of which includes an author index and shunted subject-taxonomic-geographic indexes. All indexes are cumulated annually. There are over 1,000 subscribers to ASFA, about 175 of them in developing countries.

In the USA, the database is loaded in the DIALOG system, in Canada in the Q/L system and (for SDI services) at the Canadian Institute for Scientific and Technical Information (CISTI). In France, DOCOCEAN hosts the database, and in Germany F.R., DIMDI. Via the telecommunication networks TELENET, TYMNET and EURONET, the database is searched in many other countries, including several developing countries. Because of its broad international coverage and file structure, the database has been well received in development-assistance agencies.

Approximately 65% of the records refer to papers dealing with biological aspects and the exploitation of living resources, and 35% with oceanographic phenomena, marine geology, non-living resources and their exploitation. Some 65% of current accessions are derived from journal articles published in some 5,500 journal titles which are monitored cover-to-cover, issue-by-issue, plus others less formally identified by various means. About 20% of the records derive from books (including chapters in books), conference proceedings and similar commercially available sources, and the remaining 15% from the nonconventional report literature.

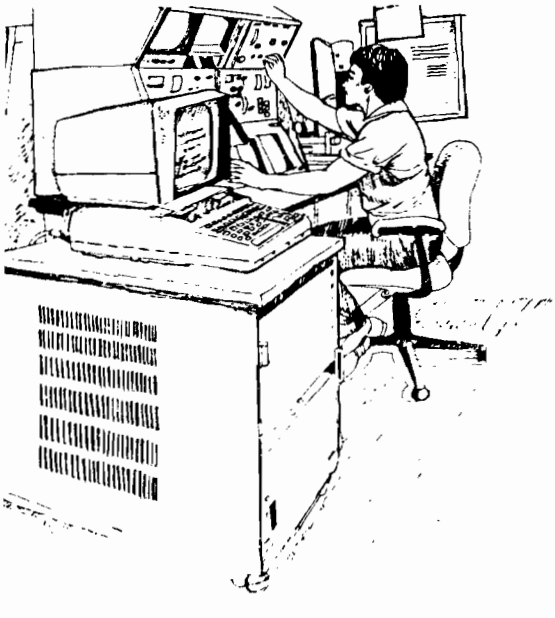
The records are allocated to one or more of the 260 clearly defined subject categories grouped into 44 major subject



areas; this fine division greatly facilitates browsing in both the published abstracts and the database. Subject indexing is based on a hierarchically structured thesaurus of some 5,000 terms, taxonomic indexing on an authority list which permits indexing down to family, genus or species level as needed, and geographic indexing on an authority list from which index entries from major geographic/geophysical areas down to quite minor areas (lakes, rivers, bays, etc.), may be constructed, as relevant to the activity being reported. Thus, even if the database is loaded into a system which does not permit "free-text" searching, or from which the abstracts are excluded altogether, it is possible to run highly selective searches. Similarly, if needed, highly specific retrieval is possible using the printed indexes.

From a relatively humble birth in 1971 when, with the support of two national institutions, ASFA was created by merging FAO's "Current Bibliography for Aquatic Sciences and Fisheries" with the commercially produced "Aquatic Biology Abstracts," input for the database is now submitted by a network of eighteen institutions in eight Member-States (Canada, France, Germany F.R., Mexico, Portugal, United Kingdom, U.S.A. and U.S.S.R.) and the publisher of ASFA (Cambridge Scientific Abstracts, Washington, D.C.). After a brief absence due to budgetary problems, Japan will hopefully soon resume full participation.

The present is a far cry from what is commonly considered as the "ideal"



cooperative system with full participation of all Member-States–particularly developing Member-States–but a combination of circumstances dictates against emphasis on "full" participation as an immediate objective. However, perhaps more than in most areas of potential cooperation, the recently recognized importance of the aquatic environment for economic development is breeding a variety of intergovernmental and/or regional bodies whose function is not simply to "regulate" and to "coordinate," but to conduct relevant research. It is through these bodies that the ASFIS Secretariat seeks to promote broadened participation.

Thus, UNDP's "Aquaculture Development and Coordination Programme" (ADCP) has opted to link its aquaculture information network to ASFIS (see article, p. 9).

On a somewhat different plane, the guidelines developed for the ASFIS bibliographic database are being adopted in a variety of emerging national systems. As an example, the ASFIS thesaurus is used to index Canada's annual bibliography of fisheries publications. The Red Sea Commission is contemplating its use in its documentation center and, in Australia, it has provided the basis for a more specialized thesaurus for an information system on the Great Barrier Reef. In Argentina, its terminology has been independently translated into Spanish and published for local use. Translation of the thesaurus into French is now being examined as a joint undertaking of French and Canadian institutions.

Although these developments are only spin-offs from the ASFIS program, they are nonetheless important because they are paving the way to consistency in national systems. This not only facilitates information transfer; it also facilitates the future growth of ASFIS, for one of the major tasks in taking ASFIS from a developing to an operational system has been the design, adaptation and implementation of the authorities and formats used.

MSCT and FACT

Some years after FAO commenced publication of the "Current Bibliography for Aquatic Sciences and Fisheries" (in 1959), it became apparent that a complementary service to disseminate information rapidly on recent research was needed. Recognizing that results of such research are published substantially in the "core" journals, in 1966 FAO, with the support of Unesco, commenced publication of "Marine Science Contents Tables" (MSCT), a monthly publication which directly reproduces the contents pages of the "core" journals, issue by issue. In 1966, a sister publication, "Freshwater and Aquaculture Contents Tables" (FACT), made its debut, and now publishes the contents pages of 50 relevant journals. Twenty titles, those which include papers on coastal aquaculture, are covered by both MSCT and FACT. Despite steps taken to eliminate personal copies, the mailing lists grow. MSCT now goes to about 3,800 addresses worldwide, and FACT to 1,800.

World List of Aquatic Sciences and Fisheries Serial Titles

This ASFIS module carries the extended title and its abbreviation (as used in the bibliographic database), the name and address of the issuing body, the language(s) and frequency of publication, and the language(s) of summaries, if any, for these serial publications. Previous titles, or variations of the present title or name of the issuing body, are included where relevant. The traditional librarian's tools of this nature–the comprehensive world lists of all scientific serials–have now become so expensive that they are a severe drain on the budgets of all but the large libraries even in developed countries.

Since the bibliographic database became available online, the previously brisk demand for this ASFIS product has become almost overwhelming. The message seems clear: the fugitive literature which, by document type, now constitutes the fastest growth in the database, is attracting more attention and, as opposed to the conventional journal literature, is difficult to come by without the information disseminated in the World List. The list has now been published in six volumes, the first of which appeared in 1975. Each volume lists titles which have not appeared in previous volumes; some 4,000 core and peripheral serial titles are now covered. Plans to computerize the file are on hand.

ASFIS Meetings Register

During any twelve-month period, up to about 100 meetings dealing with some aspects of marine and freshwater affairs.

and of international interest, are held, and perhaps twice as many are in the planning stage—sometimes as much as 2 to 3 years ahead of the date the meeting will be held. Information about these meetings is collected from a wide variety of sources as it becomes available and an entry is made in the computerized ASFIS Meetings Register. Information from the register is then disseminated through MSCT and FACT, a greatly appreciated feature of these publications.

ASFIS Institutions and Experts Register

This file has its roots in a biographical index of fishery scientists established by FAO to facilitate recruitment of experts for field assignments. Following recommendations in 1967 of the Executive Committee of the Scientific Committee on Oceanic Research (SCOR) of the International Council of Scientific Unions (ICSU), the scope of the information collected was broadened in order to provide a reference list of scientists involved in oceanographic work; and an indication of the activities in various laboratories and organizations. Thus, in 1970, the first "International Directory of Marine Scientists" was published by FAO with the financial support of Unesco/IOC. A revised, greatly enlarged directory was published in 1977 and a second up-date, which will include the names of about 19,000 scientists working in over 4,000 institutions world-wide, will be published later this year. Indexes will enable users to identify registrants by name, by institution within country, and by specialties and activities.

When work on the directory is completed, the register will be re-formatted for online interrogation. The register will then be responsive to greatly augmented search criteria such as nationality, languages spoken, educational qualifications and more detailed specialties and activities.

ASFIS Register of International Marine Affairs Activities

This is the youngest in the ASFIS family of databases. Indeed, it is still very much in the embryonic stage, and at present carries information on 149 UN-agency activities—status, subject, geographic areas, title and statement of objectives, prior activities and funding—as a pilot operation.

As a result of many expressions of interest, over many years, the ASFIS Secretariat examined the feasibility of creating a database which would cover relevant on-going research in or relevant to developing countries. This examination suggested that the scope of the database should initially be restricted to projects operated under international agreement—bilateral, multinational cooperative and international (UN agency) projects. The reason for this is that nationally funded projects are, at present, too volatile for them to be reliably included in such a database. Notwithstanding the growing importance of ocean resources for economic development, marine science research is relatively expensive and is therefore very susceptible to changing political and economic considerations. All too often, national projects and programs are mutilated or even terminated long before they have run their anticipated course, and the chances of maintaining a *useful* file on a global basis for such projects then become extremely tenuous.

The author *(center)* at the ASFIS editorial meeting in Lisbon last year. On his left, Dr. Elda Fagetti, ASFA editor; Dr. U. Brüll, Bundesforschungsanstalt für Fischerei, Germany. To his right are Mr. D. Moulder, Marine Biological Association of the U.K. and Mrs. C. Quarini, International Retrieval Ltd., U.K.

Publications in the ASFIS Reference Series

Publications so far issued by FAO in the ASFIS Reference Series are:

- ASFIS–1 List of Periodicals Monitored for the ASFIS Bibliographic Database
- ASFIS–2 ASFIS Subject Categories and Scope Descriptions
- ASFIS–3 ASFIS Guidelines for Bibliographic Description
- ASFIS–4 ASFIS Abstracting Guidelines
- ASFIS–5 ASFIS Guidelines for Subject Categorization and Indexing
- ASFIS–6 ASFIS Thesaurus (revised and enlarged version in preparation)
- ASFIS–7 ASFIS Geographic Authority List
- ASFIS–8 ASFIS Taxonomic Authority List (enlarged version in preparation)
- ASFIS–9 ASFIS Database User Guide
- ASFIS–10 ASFIS Authority List for Corporate Names and Acronyms (final version in preparation)
- ASFIS–11 ASFIS Magnetic Tape Specifications and Record Format

Although the ASFIS Reference Series was published as a set of guidelines for those preparing inputs to the system to promote the high degree of consistency necessary for effective manipulation of computerized files, these publications are in great demand from institutions world-wide. As indicated above, the thesaurus has found wide acceptance for indexing relevant literature in several institutions, and as a point of departure for the development of specialized "micro-thesauri." Similarly, the guidelines for indexing and subject categorization, the geographic authority list, and the draft-guidelines themselves have been through several revisions. The thesaurus has recently been fully computerized with the cooperation of Unesco/IOC using the Unesco SPINES software; already, inquiries are being received concerning its availability on magnetic tape. To promote their wider distribution, FAO has waived copyright and many of these publications have been reprinted in the U.S.A. and Canada, sometimes with two publications in the series combined into a single document.

Océanis, Vol. 16, Fasc. hors-série, 1990
pp. 107-110

ASFA/ASFIS developments

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Plymouth Marine Laboratory and Marine Biological Association,
Library and Information Services, Citadel Hill, Plymouth PL1 2PB, United Kingdom

Abstract

The Aquatic Sciences and Fisheries Information System (ASFIS) is the cooperative international information system that is jointly sponsored by the Food and Agriculture Organisation, the Intergovernmental Oceanographic Commission of Unesco and the United Nations Office of Ocean Affairs and the Law of the Sea. It has been developing for almost twenty years and operational for fifteen years with the support and active participation of a number of governments of UN members states, including European countries, and in that time has received recognition for its information products and services. The aim is by cooperative effort to accomplish what no single country, agency or private organisation could achieve.

Most of you are familiar with the system ASFA/ASFIS, so I will not discuss the background, but will deal only with current and possible future developments.

Products and services

Aquatic Sciences and Fisheries Abstracts **(ASFA)** - available as a printed journal, an online database, and a compact disc database.

Current awareness publications : ***Marine Science Contents Tables*** (MSCT) ; ***Freshwater and Aquaculture Contents Tables*** **(FACT).**

Directories and Registers : ***International Directory of Marine Scientists*** ; Regional directories compiled with the United Nations Environment Programme ; ***ASFIS Meetings Register.***

System tools : **ASFIS Thesaurus ; ASFIS Geographic Authority List ; ASFIS Subject Categories**, and similar guides and manuals used not only in the preparation of ASFA and ASFIS products, but also of value in the general organization of aquatic libraries and information services.

Current and future developments

ASFIS is seeking to involve more countries and more regions and a strategy of decentralisation and regionalisation is being adopted. The latest country to become formally associated with ASFIS is India, with the National Institute of Oceanography, Goa, now providing input for ASFA.

By international standards ASFIS is a relatively cheap system ; nevertheless ASFA suffered in 1987 and 1988, when the number of abstracts published annually dropped by about 25 % due to financial and other factors. The aim is to publish about 32,000 abstracts a year, but in those years backlogs of input were accumulated by the publisher. The problems have been resolved. The backlog is being eliminated, and this year, 1990, some 36,000 papers will be processed.

ASFIS is not just ASFA, and projects in developing regions and developing countries use ASFIS methodology in their information networks. Generally these networks aim to capture local information and to provide local information services, while being capable of transferring appropriate bibliographic records to the international ASFIS system.

This development has come at a time when we no longer must depend on large, expensive mainframe computers. The availability of microcomputers and suitable bibliographic software such as Unesco's CDS/ISIS makes it possible to capture and record information in local databases. By ensuring that the bibliographic records conform in structure to international standards, appropriate records, or sections of the database, can be transferred regularly to ASFIS for inclusion in the international system. Similarly, records can be downloaded from the ASFA database if required, and transferred into local databases.

Services based on local databases plus the ASFA Compact Disc are now standard elements of regional and national systems, and have led to the concept known as "ASFIS-PC". This is envisaged as a microcomputer package which includes personal computer, a CD reader, CDS/ISIS bibliographic software installed with suitable structures and formats, together with a printer and word processing or possibly desktop publishing software. This enables anyone with basic keyboarding skills and minimum computer literacy to produce databases, directories and other information products. Freedom from the costs of mainframe computers, requiring special environments, special maintenance and specialist personnel, and from online systems requiring expensive telecommunications links, have revolutionized information work, not only in developing countries but also for all of us. The ASFIS strategy is to recommend the use of the Unesco CDS/ISIS bibliographic software, which is very powerful and widely used, especially in developing countries.

One element missing is an adequate document delivery system. Document delivery remains a major problem in many parts of the world, and not just in developing countries. Groups such as ours spend a great deal of time in discussing the problem, but it is a general problem in science, and is certainly not limited to aquatic sciences ; the problem is mainly one of cost. The building up of local capabilities, with collections of the major books and journals being held nationally or regionally, is the only real solution.

A few years ago an ASFIS concept was to compile a bibliography of key books and journal articles in our subject area, and perhaps make available copies of the documents on microfiche. Today's suggestion is to use Compact Disc technology. An aquatic library on disc, or on a series of discs is a real possibility – given funding. A possible project for our European group would be to compile a directory or guide to the aquatic sciences core literature – the key monographs, textbooks directories and periodicals in our subject area. Another would be to work towards a more coordinated European input to ASFA, ensuring that all relevant European publications, particularly the "grey" and report literature was abstracted and included in the database.

A major requirement is the very real need for reviews, summaries and analyses of the literature. It is all very well to produce a list of 10,000 references on, say, the Mediterranean, or to tell an enquirer that there are 2,000 papers on North Sea pollution, or 2,000 on mussel culture. The information needs to be summarized, with the key papers and the key data being identified and made available. The mass of information and data available today, and being produced today, makes it more imperative than ever to produce information and data summaries, reviews and inventories.

Finally, training : ASFIS has made efforts to train both users and information professionals, and to recommend standards for information handling which can be applied locally, nationally and regionally, and which conform to international practice. A training strategy is evolving, but of course depends on funding.

ASFIS is a cooperative system ; it is your system, intended to respond to your requirements, and seeks your support, encouragement and participation.

Aquatic Sciences and Fisheries Information System

ASFIS SUBJECT CATEGORIES AND SCOPE DESCRIPTIONS

Fishery Information, Data and Statistics Service
Fisheries Department

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
ROME, September 1983

PREFACE

The Aquatic Sciences and Fisheries Information System (ASFIS) is an international information system for the science and technology of marine and freshwater environments, including socio-economic and legal aspects. The system is jointly sponsored by the Food and Agriculture Organization of the United Nations (FAO), the Intergovernmental Oceanographic Commission of Unesco (IOC) and the United Nations Ocean Economics and Technology Branch (UNOETB). Input for the ASFIS bibliographic database is submitted from a growing number of national centres. Cambridge Scientific Abstracts (CSA), Maryland (USA), prepares the database under contract with FAO, and also publishes the monthly update to the database "Aquatic Sciences and Fisheries Abstracts" (ASFA). It is a pleasure to acknowledge the support of all these agencies and institutions.

The ASFIS Reference Series comprises the rules, authority lists, formats, codes, etc. on which the system is based.

INTRODUCTION

The ASFIS Bibliographic Database is but one product of the ASFIS system.

The database is an indexed and abstracted collection of bibliographic references stored on magnetic tape, and can be accessed by computer retrieval techniques. Updates to the database are published in printed form each month as Aquatic Sciences and Fisheries Abstracts (ASFA).

The categorization scheme presented in this document is applied to the groupings of the references in the ASFA journal and the database, by the subject headings and codes, respectively.

It should be noted that ASFA is published in two parts: ASFA-1 which covers biological sciences, living resources and related socio-economic and legal aspects; and ASFA-2 which covers ocean technology, non-living resources and related socio-economic and legal aspects. Accordingly, the subject categorization scheme is also divided into two parts, the first relevant for ASFA-1 and the second relevant for ASFA-2.

In its application to the creation of ASFIS bibliographic records, the scheme presented must be used in conjunction with the guidelines presented in the document "ASFIS Guidelines for Subject Categorization and Indexing" (ASFIS-5). Note particularly the scope descriptions included here-in, which define the intended scope of each subject category.

NOTE: This first revision of ASFIS-2 contains no significant changes over the previous edition. No subject categories or codes have been changed, added or deleted. The revision has concentrated on correcting typographical errors and clarifying scope notes particularly for records which should be allocated to both ASFA-1 and ASFA-2.

BOTANY

221 General
222 Geographic distribution
223 Taxonomy and morphology
224 Reproduction and development
225 Genetics and evolution
226 Physiology, biochemistry, biophysics

INVERTEBRATE BIOLOGY : GENERAL

241 General
242 Geographical distribution
243 Taxonomy and morphology
244 Reproduction and development
245 Genetics and evolution
246 Physiology, biochemistry, biophysics

MALACOLOGY

261 General
262 Geographical distribution
263 Taxonomy and morphology
264 Reproduction and development
265 Genetics and evolution
266 Physiology, biochemistry, biophysics

CARCINOLOGY

281 General
282 Geographical distribution
283 Taxonomy and morphology
284 Reproduction and development
285 Genetics and evolution
286 Physiology, biochemistry, biophysics

ENTOMOLOGY

301 General
302 Geographical distribution
303 Taxonomy and morphology
304 Reproduction and development
305 Genetics and evolution
306 Physiology, biochemistry, biophysics

CHORDATE BIOLOGY: GENERAL

321 General
322 Geographical distribution
323 Taxonomy and morphology
324 Reproduction and development
325 Genetics and evolution
326 Physiology, biochemistry, biophysics

AQUATIC SCIENCES AND FISHERIES INFORMATION SYSTEM

Aquatic Sciences and Fisheries Thesaurus

Descriptors Used in the Aquatic Sciences and Fisheries Information System

Compiled by

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Institute of Oceanographic Sciences, Wormley, Godalming, Surrey, U.K.

J.R.L. Sears
Cambridge Scientific Abstracts, Bethesda, MD, U.S.A.

Published by
Cambridge Scientific Abstracts
for
Food and Agriculture Organization of the United Nations
Rome 1986

Introduction

by

Elda Fagetti
FAO

1. PURPOSE AND COVERAGE OF THE ASFIS THESAURUS

1.1 Purpose

The ASFIS Thesaurus has been conceived so as to correspond to the objectives of the ASFIS system. It permits the subject indexing and retrieval of information on all aspects of aquatic sciences and technology, exploitation of living and non-living resources, related policy, social and economic aspects, processing and marketing of aquatic products, as recorded and stored in the Aquatic Sciences and Fisheries Information System's ASFA database. So far as can be ascertained, this is the only Thesaurus devoted to this broad field of knowledge. It supersedes the "Thesaurus of Terms for Aquatic Sciences and Fisheries" published in 1976 as FAO Fisheries Circular number 344.

1.2 Status of Thesaurus Development

It is perhaps worthwhile to emphasize that a technical thesaurus is not concerned with "semantic perfection" or exact hierarchy of scientific disciplines. Its structure is developed in accordance with the pragmatic requirements of information retrieval. The terminology presented in this publication has resulted from the experience gained in indexing over 300,000 records for Aquatic Sciences and Fisheries Abstracts during 1971-85. Extensive reference has been made to other related authority lists, thesauri, term glossaries and dictionaries. A list of these can be found in the bibliography. Nevertheless, terminology relevant to any area of scientific/technological development grows hand-in-hand with that development, and no thesaurus can ever be regarded as final.

The effort of compiling a more comprehensive Thesaurus for ASFIS and its ASFA database will take several more years. Rather than tolerate further delay in revising the now outdated 1976 edition, the ASFA Advisory Board has chosen to publish this Thesaurus now. Users may find some topics within the scope of ASFIS still not satisfactorily covered. To facilitate revision and up-dating, comments on and/or criticisms of the Thesaurus are welcome. Such comments/criticisms as well as suggestions for new terms to be added to the Thesaurus should be submitted on the forms found in this Thesaurus to:

Fishery Information, Data and Statistics Service
Attention: ASFA
Fisheries Department
Food and Agriculture Organization
of the United Nations
00100 Rome, Italy.

The Thesaurus covers only subject index terms and should be used in conjunction with the ASFIS Guidelines for Subject Categorisation and Indexing - (ASFIS-5) - and the other ASFIS indexing tools, namely ASFIS Geographic Authority List - (ASFIS-7) - for geographic indexing and the NODC Taxonomic Code, for taxonomic indexing.

1.4 Field coverage of the ASFIS Thesaurus

The specialised field coverage of the ASFA Thesaurus can be divided into a core area which is treated in depth at very specific levels and peripheral areas requiring less refined treatment and treated only when relevant to the ASFA scope.

Strictly Core Areas

Aquatic natural and applied sciences such as:

Biology	Aquaculture
Ecology	Geology
Environmental sciences	Geophysics
Oceanography	Meteorology and climatology
Limnology	Fisheries sciences

Technology and Engineering such as:

Marine technology	Fishing technology
Ship technology	Fish food technology

Living and non-living resources exploitation and processing, such as:

Fishable stocks	Cultured stocks
Fishery products	Freshwater from the sea
Energy from the sea	Chemicals from the sea
Minerals from the sea	Oil and gas

Aquatic pollution and its effects in organisms

Aquatic environmental changes, conservation, public health

Social, economic and policy relevant aspects

Marginal or peripheral areas

Exact and natural sciences, such as:

Biology	Chemistry
Mathematics	Physics
Space sciences	Statistical sciences

Human and social sciences:

Development sciences	Economics
History	International relations
Pedagogy	Management

Applied sciences and technologies

Engineering relevant sciences	Information sciences
Medical sciences	Transport technology
Power technology	Potable and waste water treatment technology

AQUACULTURE TECHNIQUES (cont'd)
RT HATCHERIES
RT INDUCED BREEDING
RT LABORATORY CULTURE
RT MARINE AQUACULTURE
RT PLANT CULTURE
RT REARING
RT RICE FIELD AQUACULTURE
RT SEED (AQUACULTURE)
RT SEED COLLECTION
RT SELECTIVE BREEDING
RT SITE SELECTION
RT STOCKING (ORGANISMS)
RT WATER PURIFICATION

AQUACULTURISTS
SN Added in 1980
BT1 TECHNICIANS
BT2 EXPERTS
BT3 PERSONNEL
RT AQUACULTURE
RT AQUACULTURE EQUIPMENT
RT AQUACULTURE FACILITIES
RT AQUACULTURE SYSTEMS
RT AQUACULTURE TECHNIQUES
RT DIRECTORIES
RT HATCHERIES

AQUARIA
UF aquarium systems
UF oceanaria
RT AQUACULTURE EQUIPMENT
RT AQUARIOLOGY
RT ARTIFICIAL AERATION
RT ARTIFICIAL FEEDING
RT BATCH CULTURE
RT CAPTIVITY
RT CONTINUOUS CULTURE
RT MUSEUMS
RT ORNAMENTAL FISH
RT REARING
RT WATER FILTRATION
RT WATER PUMPS

AQUARIOLOGY
RT AQUARIA
RT ARTIFICIAL AERATION
RT ARTIFICIAL FEEDING
RT BACTERIOCIDES
RT CAPTIVITY
RT CLEANING BEHAVIOUR
RT LABORATORY EQUIPMENT
RT ORNAMENTAL FISH
RT REARING
RT WATER FILTERS
RT WATER FILTRATION

AQUARIUM CULTURE
SN Added in 1982
BT1 AQUACULTURE SYSTEMS
RT FISH CULTURE
RT ORNAMENTAL FISH
RT WATER PUMPS

AQUARIUM FISH
USE **ORNAMENTAL FISH**

AQUARIUM SYSTEMS
USE **AQUARIA**

AQUATIC AGRICULTURE
USE **AQUACULTURE**

AQUATIC ANIMAL DISEASES
USE **ANIMAL DISEASES**

AQUATIC ANIMAL PRODUCTS
USE **ANIMAL PRODUCTS**

AQUATIC ANIMALS
SN Any microscopic or macroscopic animal organisms living permanently or developing a part of their life cycle in an aquatic environment
UF animals (aquatic)
UF aquatic fauna
NT1 AQUATIC BIRDS
NT2 MARINE BIRDS
NT3 GUANO BIRDS
NT1 AQUATIC INSECTS
NT1 AQUATIC MAMMALS
NT2 MARINE MAMMALS
NT1 AQUATIC REPTILES
NT1 BRACKISHWATER MOLLUSCS
NT1 FISH
NT2 AIR-BREATHING FISH
NT2 BAIT FISH
NT2 BRACKISHWATER FISH
NT2 FOOD FISH
NT2 FORAGE FISH
NT2 FRESHWATER FISH
NT3 COARSE FISH
NT2 GAME FISH
NT2 HERBIVOROUS FISH
NT2 MARINE FISH
NT3 REEF FISH
NT2 ORNAMENTAL FISH
NT2 POISONOUS FISH
NT2 TRASH FISH
NT2 TROPICAL FISH
NT1 FRESHWATER CRUSTACEANS
NT1 FRESHWATER MOLLUSCS
NT1 MARINE CRUSTACEANS
NT1 MARINE INVERTEBRATES
NT1 MARINE MOLLUSCS
RT ANIMAL DISEASES
RT ANIMAL FOSSILS
RT ANIMAL MORPHOLOGY
RT ANIMAL PHYSIOLOGY
RT ANIMAL POPULATIONS
RT ANIMAL PRODUCTS
RT AQUATIC ORGANISMS
RT BIOGEOGRAPHY
RT COMMERCIAL SPECIES
RT FRESHWATER ECOLOGY
RT GILLS
RT HYDROBIOLOGY
RT MARINE ECOLOGY
RT RARE SPECIES
RT VERNACULAR NAMES
RT ZOOBENTHOS
RT ZOOLOGY
RT ZOOPLANKTON

AQUATIC BIOLOGISTS
USE **BIOLOGISTS**

AQUATIC BIOLOGY
USE **HYDROBIOLOGY**

AQUATIC BIRDS
UF birds (aquatic)
BT1 AQUATIC ANIMALS
NT1 MARINE BIRDS
NT2 GUANO BIRDS
RT ANIMAL PRODUCTS
RT AVIAN PHYSIOLOGY
RT FEATHERS
RT FLIGHT BEHAVIOUR
RT FLYING
RT IMPRINTING
RT MIGRATIONS
RT MIGRATORY SPECIES
RT NESTING
RT NESTS
RT ORNITHOLOGISTS

AQUATIC BIRDS (cont'd)
RT ORNITHOLOGY
RT PECKING ORDER
RT WINGS

AQUATIC BOTANICAL RESOURCES
USE **BOTANICAL RESOURCES**

AQUATIC COMMUNITIES
UF communities (ecological)
NT1 BENTHOS
NT2 MEIOBENTHOS
NT2 PHYTOBENTHOS
NT2 ZOOBENTHOS
NT1 EPIPSAMMON
NT1 NEKTON
NT1 NEUSTON
NT1 PERIPHYTON
NT1 PLANKTON
NT2 CRYOPLANKTON
NT2 NANNOPLANKTON
NT2 PHYTOPLANKTON
NT2 ZOOPLANKTON
NT3 HOLOPLANKTON
NT3 ICHTHYOPLANKTON
NT3 MEROPLANKTON
NT3 SAPROPLANKTON
NT1 PLEUSTON
NT1 PSAMMON
NT1 SESTON
RT AQUATIC ENVIRONMENT
RT AQUATIC ORGANISMS
RT BIOCOENOSIS
RT BIOLOGICAL CHARTS
RT BIOTA
RT BRACKISHWATER ECOLOGY
RT CLIMAX COMMUNITY
RT COMMUNITY COMPOSITION
RT ECOLOGICAL ASSOCIATIONS
RT ECOLOGICAL SUCCESSION
RT ECOSYSTEM DISTURBANCE
RT ECOSYSTEM MANAGEMENT
RT ECOSYSTEM RESILIENCE
RT ECOSYSTEMS
RT FRESHWATER ECOLOGY
RT HABITAT
RT MARINE ECOLOGY
RT NICHES
RT ORGANISM AGGREGATIONS
RT SYNECOLOGY

AQUATIC DRUGS
SN Drugs of aquatic origin and their medical uses
BT1 DRUGS
RT BOTANICAL RESOURCES
RT MEDICINE
RT NATURAL RESOURCES
RT PLANT UTILIZATION

AQUATIC ECOLOGY
USE **ECOLOGY**

AQUATIC ENVIRONMENT
SN Environment of all types of hydrosphere
UF environment (aquatic)
BT1 ENVIRONMENTS
NT1 BENTHIC ENVIRONMENT
NT2 ABYSSOBENTHIC ZONE
NT2 BATHYAL-BENTHIC ZONE
NT2 LITTORAL ZONE
NT3 EULITTORAL ZONE
NT3 SUBLITTORAL ZONE
NT3 SUPRALITTORAL ZONE
NT1 BRACKISHWATER ENVIRONMENT
NT1 INLAND WATER ENVIRONMENT
NT2 LENITIC ENVIRONMENT
NT2 LOTIC ENVIRONMENT
NT1 INTERSTITIAL ENVIRONMENT

ASFIS REFERENCE SERIES, No. 3, Revision 1 ASFIS-3 (Rev.1)

AQUATIC SCIENCES AND FISHERIES INFORMATION SYSTEM

GUIDELINES FOR BIBLIOGRAPHIC DESCRIPTION

prepared by

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905 Enderby Drive
Alexandria, Virginia 22302, USA

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome 1986

The Aquatic Sciences and Fisheries Information System (ASFIS) is an international information system for the science and technology of marine and freshwater environments, including their socio-economic and legal aspects. The system is maintained jointly by the Food and Agriculture Organization of the United Nations (FAO), the Intergovernmental Oceanographic Commission of Unesco (IOC) and the United Nations Ocean Economics and Technology Branch (OETB) with the collaboration of the national ASFIS partners. The system's information outputs currently include: (1) the computer searchable ASFA bibliographic database and its print product derivatives Aquatic Sciences and Fisheries Abstracts (ASFA) and ASFA Aquaculture Abstracts; (2) Marine Science Contents Tables (MSCT); (3) Freshwater and Aquaculture Contents Tables (FACT); (4) the ASFIS Meetings Register; (5) the Institutions and Experts Register; (6) A World List of Serial Titles in Aquatic Sciences and Fisheries.

The ASFIS Reference Series comprises the rules, authority lists, formats, codes etc., on which the system is based.

ASFA INPUT SHEET 1 **BIBLIOGRAPHIC DATA** ANNEX 5

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TITLE

Suitability of an unprocessed natural diet composed of trawling fishing scraps for Penaeus kerathurus culture.#Convenienza di una dieta naturale non trattata composta da scarti della pesca a strascico per coltura di Penaeus kerathurus

CONFERENCE

PERSONAL AUTHORS AND AFFILIATION

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LEVEL 3 TITLE

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AQUATIC SCIENCES AND FISHERIES INFORMATION SYSTEM

GEOGRAPHIC AUTHORITY LIST

prepared by
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INTRODUCTION

The ASFIS Geographic Authority List was first published in 1974 and revised and reprinted in 1976 and 1979. This version supersedes all previous editions.

No major changes have been made to the principles underlying entries in the List; however the organization of the List has been modified. Recent changes in country names have been introduced, and additional entries added to reflect increased scientific and/or economic interest.

The alphabetical listing is based on English language descriptions, usually as they appear in the Times Atlas or the British Post Office Guide. Some cross-references from other languages have been included. A list of the authorities consulted appears in the Bibliography on page 91. The codes used in the designation of coastal areas, sea areas, currents and undersea features are assigned on the basis of the map on page 89, and the accompanying definitions. A series of faceted lists are added at the end of the main alphabetical sequence. These group together the preferred entries in a number of facets, e.g. Tectonic Plates.

The List has been developed as the authority for the preparation of geographic index-entries for the ASFIS bibliographic database and its print products Aquatic Sciences and Fisheries Abstracts (ASFA) and ASFA Aquaculture Abstracts. For this purpose, it should be used in conjunction with the *ASFIS Guidelines for Subject Categorization and Indexing (ASFIS-5)*.

The List should also be used as the authority for names of geographic features in the preparation of English abstracts and the English translation of non-English titles. With discretion, it may be used as the authority for country names in other parts of ASFIS records, viz. in corporate authority and patent assignee names, in authors' addresses/affiliations, in conference place names, and in country of publication, but if, and only if, such use is not in conflict with the *ASFIS Guidelines for Bibliographic Description (ASFIS-3)*.

ALPHABETICAL SEQUENCE

ABU DHABI

(member of United Arab Emirates)
for coast use: ISW, Abu Dhabi

ABU QIR FIELD

use: ISW, Egypt, Arab Rep., Abu Qir Field

ABYSSINIA

see: Ethiopia

ACORES

see: Azores

ADDU ATOLL

use: Maldive I., Addu Atoll
for coast use: ISW, Maldive I., Addu Atoll
see also: Maldive I.

ADELIE LAND

(Antarctica)
for coast use: PSE, Adelie Land
see also: Antarctica
French Austral and Antarctic Territory

ADEN

see: Yemen, People's Dem. Rep.

ADEN GULF

use: ISW, Aden Gulf

ADMIRALTY I.

(in Bismarck Archipelago, part of Papua New Guinea)
includes: Manus I.
for coast use: ISEW, Admiralty I.
see also: Papua New Guinea

ADRIATIC SEA

use: MED, Adriatic

AEGEAN I.

use of a subentry is recommended, e.g.:
Cyclades (Kikladhes)
Dodecanese (Sporadhes)
Euboea (Evvoia)
Limnos (Lemnos)
Northern Sporades (Voriai Sporadhes)
Rhodes (Rodhos)
for coast use: MED, Aegean I.

AEGEAN PLATE

AEGEAN SEA

use: MED, Aegean

AERMELKANAL

use: ANE, English Channel

AFARS

see: Djibouti

AFGHANISTAN

no coastline

AFRICA

use of a more specific entry is recommended

AFRICA COASTS

use of a more specific entry is recommended, e.g.:
ASE, Africa (for West African coast)
ISW, Africa (for East African coast)
MED, Africa (for North African coast)
PSW, Africa (for Southern African coast)

AFRICA INLAND WATERS

used for FAO Fishing Area 01 (CIFA Area)
use of a more specific entry is recommended

AFRICA, ALBERT L.

(= Mobutu Sese Seko L.)
for more specific studies use:
Uganda, Albert L.
Zaire, Albert L.

AFRICA, BARINGO L.

AFRICA, BLUE NILE R.

see also: Africa, Nile R.
Ethiopia, Blue Nile R.
Sudan, Blue Nile R.

AFRICA, CHAD L.

for more specific studies use:
Cameroon, Chad L.
Chad, Chad L.
Niger, Chad L.
Nigeria, Chad L.

AFRICA, CHILWA L.

for more specific studies use:
Malawi, Chilwa L.
or Mozambique, Chilwa L.

AFRICA, EAST

(used for East Africa land areas)
for coast use: ISW, Africa